

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 1, 2017/2018

### TIS3151 – SOFTWARE RELIABILITY AND QUALITY ASSURANCE

(All sections / Groups )

11<sup>th</sup> October 2017  
9 am - 11 am  
(2 Hours)

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#### INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 4 pages excluding the cover page with 5 Questions only.
2. Attempt all **FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the Answer Booklet provided.

**QUESTION 1**

- a. Software development is done by students, amateurs and professionals. All of them deal with quality problems. Describe any ONE of the characteristics of the Software Quality Assurance (SQA) environment (e.g. contractual conditions.) in which software is developed.

[2 Marks]

- b. Identify the cause of error from the description given below:

- (i) One of the requirements of a municipality's local tax software system refers to discounts granted to various segments of the population: senior citizens, parents of large families and others. Unfortunately, a discount granted for students was not included in the requirements document.
- (ii) Due to time or budget pressures, the developer decides to omit part of the required function in an attempt to cope with these pressures.

[2 Marks]

- c. Given below are extracts from various requirements documents. Identify the quality factor it refers to and justify your answer:

- (i) The probability of missing data about a member, his attendance at club events and his payments will not exceed 1%

[1 Mark]

- (ii) The medical staff in the hospital should be able to use all system functions after 4 hours of training. The average number of errors made by these users shall not exceed 2 per hour of system use.

[1 Mark]

- (iii) The failure frequency of flight navigation system software is required to be less than one in 20 years

[1 Mark]

- (iv) The R & D team of a washing machine manufacturer was instructed to develop the software required for the firmware to be suitable for all six variations of model 2015 washing machines.

[1 Mark]

- (v) The programming will adhere to the company coding standards and guidelines.

[1 Mark]

- (vi) Access to a multimedia learning system for students is restricted to read and download options only. Lecturers are allowed access to change information in the system only if the password matches.

[1 Mark]

*Continued.....*

**QUESTION 2**

- a. One of the advantages of prototyping model is 'easier and faster user comprehension' of the new system. Why is it so?

[2 Marks]

- b. The main objectives of testing software are to detect errors and improve the quality of the software. Using the information obtained during testing, state TWO other objectives that can be fulfilled?

[2 Marks]

- c. A project manager needs to select a Review Leader. Provide any FOUR characteristics he will be looking for in the potential candidate?

[4 Marks]

- d. What are the TWO contributions of an external expert in the review process of a project?

[2 Marks]

**QUESTION 3**

- a. Explain the relationship between Reliability and Efficiency using an example.

[2 Marks]

- b. Suggest appropriate reliability metrics for the following classes of software system:

- (i) A system that monitors patients in a hospital's intensive care unit

[1 Mark]

- (ii) A railway signaling system

[1 Mark]

- c. Reliability specifications are essential for a software product. Identify suitable **Failure class/es** that can be assigned for each of the assessment below:

- (i) An ATM system fails to operate with any card which is inserted. Software must be restarted to correct failure

[1 Mark]

- (ii) A pattern of transaction across the network causes database corruption

[1 Mark]

- d. Robert, the project manager is approached by his testing team lead to purchase testing software and appropriate high speed computers which are networked. This was to increase the reliability of the new software being developed. Will Robert agree to this request? Justify your answer with relevant reasons.

[4 Marks]

*Continued....*

**QUESTION 4**

- a. The following C++ program code is not complete. You are to complete it by following the instructions given in Lines 13-16 to ensure the concept of exception handling is implemented.

```
1.  #include <iostream>
2.  using namespace std;
3.  double division(int a, int b)
4.  {
5.      if( b == 0 )
6.      {
7.          throw "Division by zero condition!";
8.      }
9.  return (a/b);
10. }
11. int main ()
12. {
13.     i) Initialize the value for integer x. [1 Mark]
14.     ii) Initialize the value for integer y. [1 Mark]
15.     iii) Initialize the value for variable z of type double. [1 Mark]
15.     [Hint: These values would create the division by zero condition.]
16.     try {
17.         z = division(x, y);
18.         cout << z << endl;
19.     } catch (const char* msg) {
20.         cerr << msg << endl;
21.     }
22.     return 0;
23. }
```

- b. A software company insists on 'fault free' software development. Explain any FOUR important actions that need to be carried out by the programmers. [2 Marks]
- c. There is a sudden power failure in the office. The office personnel are worried about losing information that was being processed. But they are informed that there is a provision to save data in the software. How is this unexpected event handled by the software in use? Explain. [2 Marks]
- d. Application of software metrics in an organization meets with many challenges. State any THREE limitations of applying software metrics. [3 Marks]

*Continued....*

**QUESTION 5**

- a. Thomas a software quality engineer would like his organization to apply for the ISO certification. He will have to convince the board of directors on the importance of being certified. In order to help Thomas, list down any TWO benefits to an organization that has ISO certification.

[2 Marks]

- b. Provide TWO management support activities that could make software verification and validation (V&V) a success.

[2 Marks]

- c. Actsoft released accounting software at a lower price than its competitors. But the product did not sell very well and users preferred other software. The feedback received was that the software by Actsoft was too difficult to use, its downtime was very long and it had many unnecessary features.

- (i) Identify the area of risk that was not considered during the development of the software.
- (ii) Suggest how this risk could have been minimized.

[2 Marks]

- d. Mr. Marzuki is the new quality manager for SFQTech Sdn. Bhd. He insists in implementing Total Quality Management (TQM) in the organization. Give TWO reasons why he feels it is essential to have TQM in the organization.

[2 Marks]

- e. What are the critical dimensions that organizations typically focus on in CMMI-DEV other than 'people' dimension to improve processes?

[2 Marks]

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